

CLAIMS

1. A soluble lubricating surface-treated stainless steel sheet with excellent shapability for fuel tanks, comprising a substrate having on both surfaces or one surface thereof a soluble lubricating resin film, said substrate being a stainless steel sheet selected from the group consisting of an austenite-type stainless steel sheet, a ferrite-type stainless steel sheet and a two phase-type stainless steel sheet.

2. A soluble lubricating surface-treated stainless steel sheet with excellent shapability for fuel tanks, comprising a substrate having on both surfaces or one surface thereof a soluble lubricating resin film mainly comprising (A) a soluble polyurethane resin composition containing a carboxyl group or a sulfonic acid group within the molecule and having a glass transition point of 100°C or more as a dry film and (B) a lubricating function-imparting agent in an amount of from 1 to 30% by mass based on said soluble polyurethane resin composition, said substrate being a stainless steel sheet selected from the group consisting of an austenite-type stainless steel sheet, a ferrite-type stainless steel sheet and a two phase-type stainless steel sheet.

3. A soluble lubricating surface-treated stainless steel sheet with excellent shapability for fuel tanks, comprising a substrate having on both surfaces or one surface thereof a soluble lubricating resin film mainly comprising (A) a soluble polyurethane resin composition containing a carboxyl group or a sulfonic acid group within the molecule and having a glass transition point of 100°C or more as a dry film, (B) a lubricating function-imparting agent in an amount of from 1 to 30% by mass based on said soluble polyurethane resin composition and (C) silica particles in an amount of 1 to 30% by mass based on said soluble polyurethane resin composition, said substrate being a stainless steel sheet selected from the group consisting of an austenite-type stainless

steel sheet, a ferrite-type stainless steel sheet and a two phase-type stainless steel sheet.

4. The soluble lubricating surface-treated stainless steel sheet for fuel tanks as claimed in claim 2 or 3, wherein the amount of an acid group contained in (A) the soluble polyurethane resin composition for forming a soluble lubricating resin film is from 30 to 180 in terms of an acid value.

5. The soluble lubricating surface-treated stainless steel sheet for fuel tanks as claimed in claim 2 or 3, wherein the neutralizer for the acid group contained in (A) the soluble polyurethane resin composition for forming a soluble lubricating resin film is sodium hydroxide or potassium hydroxide.

6. The soluble lubricating surface-treated stainless steel sheet for fuel tanks as claimed in claim 2 or 3, wherein the main component constituting (A) the soluble polyurethane resin composition for forming a soluble lubricating resin film is polyester polyol.

7. The soluble lubricating surface-treated stainless steel sheet for fuel tanks as claimed in claim 2 or 3, wherein the main component constituting (A) the soluble polyurethane resin composition for forming a soluble lubricating resin film is polyether polyol.

8. The soluble lubricating surface-treated stainless steel sheet for fuel tanks as claimed in claim 2 or 3, wherein the lubricating function-imparting agent (B) comprises one or more members selected from the group consisting of polyolefin-based wax, fluorine-containing wax, paraffin-based wax and stearic acid-based wax.

9. The soluble lubricating surface-treated stainless steel sheet for fuel tanks as claimed in claim 2 or 3, wherein the substrate is an austenite-type stainless steel sheet comprising, in % by

mass:

C: 0.5% or less,

Si: 5% or less,

Mn: 15% or less,
P: 0.1% or less,
S: 0.05% or less,
Ni: 6 to 20%,
Cr: 15 to 30%,
N: 0.5% or less, and
Al: 0.001 to 5%

with the balance consisting of Fe and inevitable impurities.

10. The soluble lubricating surface-treated stainless steel sheet for fuel tanks as claimed in any one of claims 1 to 3, wherein the substrate is a ferrite-type stainless steel sheet comprising, in % by mass:

C: 0.5% or less,
Si: 3% or less,
Mn: 5% or less,
P: 0.1% or less,
S: 0.05% or less,
Ni: 5% or less,
Cr: 9 to 30%,
N: 0.2% or less, and
Al: 0.001 to 5%

with the balance consisting of Fe and inevitable impurities.

11. The soluble lubricating surface-treated stainless steel sheet for fuel tanks as claimed in any one of claims 1 to 3, wherein the substrate is a two phase-type stainless steel sheet comprising, in % by mass:

C: 0.5% or less,
Si: 5% or less,
Mn: 15% or less,
P: 0.1% or less,
S: 0.05% or less,
Ni: 2 to 20%,
Cr: 12 to 30%,
N: 0.5% or less, and

0.001 to
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V: 0.01 to 1%,
Mg: 0.001 to 0.1%,
Ca: 0.001 to 0.1%,
B: 0.0005 to 0.05%, and
W: 0.01 to 5%.

15. A method for manufacturing a fuel tank, comprising a step of molding the soluble lubricating surface-treated stainless steel sheet for fuel tank, which is covered with a soluble lubricating resin film, as claimed in any one of claims 1 to 3, a step of treating the molded soluble lubricating surface-treated stainless steel sheet with an alkali or hot water to remove said soluble lubricating resin film, and a step of welding said soluble lubricating surface-treated stainless steel sheet after the removal of said soluble lubricating resin film.

16. The method as claimed in claim (15,) wherein the substrate is an austenite-type stainless steel sheet comprising, in % by

mass:

C: 0.5% or less,
Si: 5% or less,
Mn: 15% or less,
P: 0.1% or less,
S: 0.05% or less,
Ni: 6 to 20%,
Cr: 15 to 30%,
N: 0.5% or less, and
Al: 0.001 to 5%

with the balance consisting of Fe and inevitable impurities.

17. The method as claimed in claim 15, wherein the substrate is a ferrite-type stainless steel sheet comprising, in % by mass:

C: 0.5% or less,
Si: 3% or less,
Mn: 5% or less,

P: 0.1% or less,
S: 0.05% or less,
Ni: 5% or less,
Cr: 9 to 30%,
N: 0.2% or less, and
Al: 0.001 to 5%

with the balance consisting of Fe and inevitable impurities.

18. The method as claimed in claim 15, wherein the substrate is a two phase-type stainless steel sheet comprising, in % by mass:

C: 0.5% or less,
Si: 5% or less,
Mn: 15% or less,
P: 0.1% or less,
S: 0.05% or less,
Ni: 2 to 20%,
Cr: 12 to 30%,
N: 0.5% or less, and
Al: 0.001 to 5%

with the balance consisting of Fe and inevitable impurities.

19. The method as claimed in claim 16, wherein the substrate stainless steel sheet further comprises one or more of, in % by mass:

Mo: 0.01 to 8%,
Cu: 0.01 to 5%,
Ti: 0.01 to 1%,
Nb: 0.01 to 1%,
V: 0.01 to 1%,
Mg: 0.001 to 0.1%,
Ca: 0.001 to 0.1%,
B: 0.0005 to 0.05%, and
W: 0.01 to 5%.

20. The method as claimed in claim 17, wherein the substrate stainless steel sheet further comprises one or more of, in % by mass:

Mo: 0.01 to 8%,
Cu: 0.01 to 5%,
Ti: 0.01 to 1%,
Nb: 0.01 to 1%,
V: 0.01 to 1%,
Mg: 0.001 to 0.1%,
Ca: 0.001 to 0.1%,
B: 0.0005 to 0.05%, and
W: 0.01 to 5%.

21. The method as claimed in claim 18, wherein the substrate stainless steel sheet further comprises one or more of, in % by mass:

Mo: 0.01 to 8%,
Cu: 0.01 to 5%,
Ti: 0.01 to 1%,
Nb: 0.01 to 1%,
V: 0.01 to 1%,
Mg: 0.001 to 0.1%,
Ca: 0.001 to 0.1%,
B: 0.0005 to 0.05%, and
W: 0.01 to 5%.

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